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CLAIMS

What is claimed is:

1. A recombinant vector for introducing DNA into an eucaryotic cell, the vector comprising, in operable linkage,

a) the DNA of or corresponding to at least a portion of a retroviral vector, which portion is capable of infecting and directing the expression of a coding sequence in target cells; and

b) one or more coding sequences wherein at least one sequence encodes for a naturally occurring therapeutic antimicrobial peptide or a derivative thereof

for the treatment of at least one disease selected from the group consisting of: mammalian tumors, viral infections, bacterial infections and fungal infections.

2. The recombinant vector comprising in operable linkage,

a) a 5′ long terminal repeat region comprising the structure U3-R-U5;

b) one or more of said coding sequences wherein at least one sequence encodes for a naturally occurring therapeutic antimicrobial peptide or a derivative thereof; and

c) a 3′ long terminal repeat region comprising a completely or partially deleted U3 region wherein said deleted U3 region is replaced by a polylinker sequence, followed by the R and U5 region to undergo promoter conversion

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for the treatment of at least one disease selected from the group consisting of: mammalian tumors, viral infections, bacterial infections and fungal infections.

3. The recombinant vector according to Claim 1, wherein said coding sequence encodes the amino acid sequence of a peptide selected from the group consisting of: melittin; promelittin; prepromelittin; cecropin; prececropin; preprocecropin; magainin; apidaecin; defensin; parts, analogues and homologues thereof; and combinations thereof.

4. The recombinant vector according to Claim 2, wherein said polylinker sequence comprises at least one unique restriction site and, optionally, at least one insertion of a heterologous DNA fragment.

5. The recombinant vector of Claim 4 wherein said heterologous DNA fragment regulates the expression of at least one of the coding sequences of said retroviral vector, and comprises at least one or more elements selected from the group consisting of: regulatory elements and promoters.

6. The recombinant vector according to Claim 1 further comprising at least one non-coding sequence selected from the group consisting of: regulatory elements and promoters, which regulate the expression of at least one of the coding sequences.

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7. The recombinant vector according to Claim 6, wherein said regulatory elements and promoters are regulatable by transacting molecules.

8. The recombinant vector according to Claim 4, wherein said heterologous DNA fragment encodes a peptide selected from the group consisting of marker peptides, therapeutic peptides, cell cycle regulatory peptides, tumor suppressor peptides, antiproliferation peptides and cytokines.

9. A recombinant retroviral vector system comprising:

a) a recombinant vector for introducing DNA into an eucaryotic cell, the vector comprising, in operable linkage,

i) the DNA of or corresponding to at least a portion of a retroviral vector, which is capable of infecting and directing the expression of a coding sequence in target cells; and

ii) one or more coding sequences wherein at least one sequence encodes for at least one naturally occurring therapeutic antimicrobial peptide or a derivative thereof; and

b) a packaging cell line harboring at least one retroviral construct coding for proteins required for said retroviral vector to be packaged,

for the treatment of at least one disease, selected from mammalian tumors, viral infections, bacterial infections and fungal infections.

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10. The recombinant retroviral vector system according to Claim 9, wherein said retroviral vector comprises, in operable linkage,

a) a 5′ long terminal repeat region comprising the structure U3-R-U5;

b) one or more of said coding sequences; and

c) a 3′ long terminal repeat region comprising a completely or partially deleted U3 region wherein said deleted U3 region is replaced by a polylinker sequence, followed by the R and U5 region to undergo promoter conversion.

11. A retroviral particle produced by transfecting a packaging cell line of a retroviral vector system according to Claim 10 with the retroviral vector according to Claim 10.

12. A retroviral provirus produced by infection of target cells with a recombinant retroviral particle according to Claim 11 whereby the U3 sequence duplicated during the process of reverse transcription in the infected target cell and appears in the 5′ long terminal repeat and the 3′ long terminal repeat of the resulting provirus, and the U5 of the 5′ long terminal repeat duplicated during the process of reverse transcription in the infected target cell and appears in the 3′ long terminal repeat and in the 5′ long terminal repeat of the resulting provirus.

13. The retroviral provirus of Claim 12 wherein said polylinker comprises heterologous DNA.

14. A method for introducing nucleotide sequences into a cell population comprising infecting the cell population with the recombinant retroviruses produced by the recombinant retroviral vector system according to Claim 9.

15. The method of Claim 14 wherein the cell population is selected from the group consisting of: human cells and animal cells.

16. A method for introducing nucleotide sequences into a mammal comprising infecting the mammal with the recombinant retroviruses produced by the recombinant retroviral vector system according to Claim 9.

17. Use of a recombinant vector according to Claim 1 for producing a pharmaceutical composition for gene therapy of at least one disease selected from the group consisting of: tumors, viral infections, bacterial infections and fungal infections.

18. Use of a recombinant retroviral vector system according to Claim 9 for producing a pharmaceutical composition for gene therapy of at least one disease selected from the group consisting of: tumors, viral infections, bacterial infections and fungal infections.

19. A pharmaceutical composition containing a therapeutically effective amount of a recombinant retroviral particle according to Claim 11.

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20. mRNA of a retroviral provirus according to Claim 12.

21. RNA of a vector according to Claim 1.

22. A host cell infected with a virion according to Claim 11.

23. A method for the treatment of a disease selected from the group consisting of: a genetic defect, cancer and viral infections, comprising administering to a subject in need thereof a therapeutically effective amount of a recombinant retroviral particle produced by transfecting a packaging cell line harboring at least one retroviral or recombinant retroviral construct coding for proteins required for said retroviral vector to be packaged, with a recombinant retroviral vector comprising, in operable linkage,

a) a DNA of or corresponding to at least a portion of a retroviral vector, which is capable of infecting and directing the expression of a coding sequence in target cells; and

b) one or more coding sequences wherein at least one sequence encodes for a naturally occurring therapeutic antimicrobial peptide or a derivative thereof.

24. The method according to Claim 23 wherein the coding sequence of encodes the amino acid sequence of a peptide selected from the group consisting of: melittin; premelittin; prepromelittin; cecropin; prececropin; preprocecropin; magainin; apidaecin; defensin; a part, analogue and homologue thereof; and combinations thereof.

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25. The method according to Claim 23 for the treatment of human immunodeficiency virus infections comprising administering to a subject in need thereof a therapeutically effective amount of said recombinant retroviral particle wherein the coding sequence of said retroviral vector encodes for the amino acid sequence of cecropin or derivatives thereof.